

## Troubleshooting Wireless Networks

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Wireless technologies such as Bluetooth and WLAN are gaining popularity in the field of industrial automation. In manufacturing processes for instance, they provide flexibility, reduce the cost and effort associated with cabling and offer new ways to capture and distribute critical information, even in mobile environments. In addition to implementing flexible communication solutions with remote devices when wired connectivity is not feasible, wireless networks make it possible to open up new fields of application such as measuring and controlling portable objects while localizing and identifying them.

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### Inadequate planning can lead to interference-prone networks

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Compared to wired communication solutions, wireless is subject to much higher levels of interference from other devices and radio networks in the vicinity. Interference-free operation thus calls for adequate planning that enables so-called coexistence between the various wireless systems in use. Coexistence describes the interference-free, parallel operation of multiple adjacent wireless networks. Fraunhofer ESK researchers rely on their extensive knowledge in the field of wireless communication technology to advise companies on the installation and utilization of wireless transmission systems, even for critical enterprise applications. This includes up-front support when selecting suitable technologies and systems.

## The devil is in the details

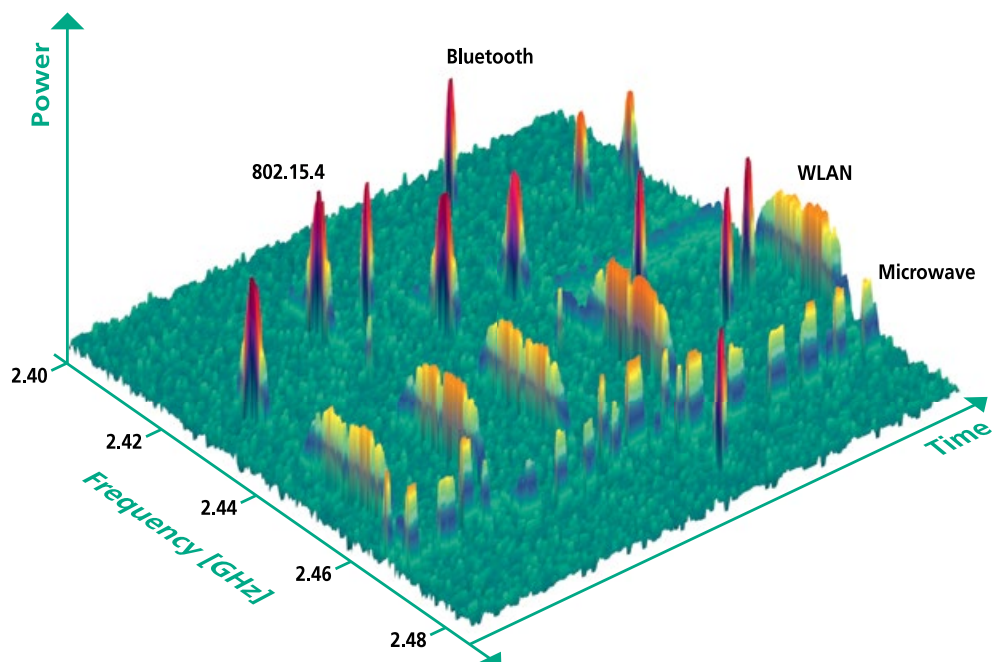
Because the radio spectrum is a shared communication medium, system design and local conditions can rapidly change during operation. It is not uncommon for a wireless connection to suddenly experience an outage despite running reliably for an extended period of time. Sporadic outages can be caused by a microwave that uses frequencies in the Bluetooth or WLAN range and which is located in the vicinity of a production system, just to name one example. Mobile phones that have WLAN or Bluetooth activated can also create interference and lead to wireless network outages. Apart from these two examples, there are numerous other causes of temporary

or permanent wireless network outages, which at first glance do not seem logical.

## Helping to make networks interference-free

Fraunhofer ESK has been actively carrying out research in the field of robust wireless transmissions for more than four years. The institute utilizes this expertise to help customers troubleshoot the causes of wireless network disruptions. This work involves on-site analyses that include measurements to detect possible sources of interference or to identify overlapping frequency ranges. Fraunhofer ESK furthermore offers Awair,

a software-based solution for carrying-out long-term analyses that can uncover sources of sporadic interference.



<sup>1</sup> If overlooked during planning, sporadic sources of interference such as a microwave can suddenly cause network disruptions. Bluetooth-activated user devices are another common source of interference.